# Unit Plan Template

Click on any descriptive text, then type your own.

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| **Unit Author** | | | | | | |
| First and Last Name | | | | | Ryan Kinnett | |
| School District | | | | | Salem-Keizer School District | |
| School Name | | | | | Early College High School | |
| School City, State | | | | | Salem, Oregon | |
| **Unit Overview** | | | | | | |
| **Unit Title** | | | | | | |
| If it Grows it Goes. | | | | | | |
| **Unit Summary** | | | | | | |
| Students will develop and implement an ecologically sound waste management program for our school that seeks to find the best composting methods for anything that grows and can decompose. Together they will brainstorm issues about the school relating to waste management then they will work in groups to research best practices and go to the experts to verify their results. The project will then result in the construction of compost bins and students will use scientific inquiry, problem solving, and experimental design to find the most effective methods to decompose specific materials. | | | | | | |
| **Subject Area** | | | | | | |
| Science, Biology, Life Science, Ecology | | | | | | |
| **Grade Level** | | | | | | |
| Grade 9-10 | | | | | | |
| **Approximate Time Needed** | | | | | | |
| 10-12 weeks, 1 period daily during the first week, 1 or 2 periods  each week thereafter | | | | | | |
| **Unit Foundation** | | | | | | |
| **Targeted Content Standards and Benchmarks** | | | | | | |
| In the Life Science Core Standards, students will be focusing on ecologicial concepts including  (1) energy and chemical flow in a system,  (2) how ecosystems change in response to disturbances and interactions, including the relationship between biotic and abiotic factors, and  (3) evaluate the impact of human activities on environmental quality and the sustainability of Earth systems. | | | | | | |
| **Student Objectives/Learning Outcomes** | | | | | |
| Students will be able to:   * Demonstrate an understanding of the ecology of composting via a variety of Web 2.0 technologies. * Identify the biotic and abiotic factors attributing to the process of composting. * Develop a waste management process for biological waste products of the school. * Propose alternative solutions to waste management issues in our community while demonstrating an understanding ecological principles and concepts. | | | | | |
| **Curriculum-Framing Questions** | | | | | |
|  | | **Essential Question** | | What can I do to live more sustainably? | |
|  | | **Unit Questions** | | (1) How is waste managed in our school, community, state?  (2) How does composting model ecological principles?  (3) How can composting today benefit the future? | |
|  | | **Content Questions** | | (1) What are the scientific factors involved in composting?  (2) How can we collect data and display it in a graph?  (3) How is composting an example of conservation of mass?  (4) What types of biological processes and chemical reactions occur during the compost process?  (5) What are some community partners that can assist with improving the waste management of our school? | |
| **Assessment Plan** | | | | | |
| **Assessment Timeline** | | | | | |
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| **Assessment Summary** | | | | | |
| Questioning and journaling throughout the unit facilitates discussion and prompts students to think at higher levels. Daily progress on the project is evaluated using the compost log and **Project Menu**, which helps students to stay on track and self-assess their progress. The various mini-projects allow students to make connections between the community and learning in the classroom as well as connect the dots with the ecological concepts taught in class. Students will use the **student project rubric** to help them self-assess work prior to completion. Conferencing and continual monitoring and feedback with groups helps to ensure students stay on track and helps to assess student learning. The **project rubric**will be used to assess the final media project as well as students’ research and surveys. Finally, students will utilitze the **peer assessment scoring guide**to provide feedback for their classmates’ final presentations. | | | | | |
| **Unit Details** | | | | | |
| **Prerequisite Skills** | | | | | |
| * Familiarity with Internet search and retrieval methods * Experience with basic word processing and Web 2.0 applications | | | | | |
| **Instructional Procedures** | | | | | |
| **Introductory Activities** – Weeks 1-2, 6-8 periods  This unit project will begin with a brainstorm with two guiding questions: 1) What are some major environmental issues that concern you? And 2) What are way to contribute to making a better tomorrow? Students will be encouraged to come up with as many ideas as they can regarding those two questions. Responses will be recorded on the board (either teacher records or students can write 1-2 two they came up with on the board). Once all the issues have been flushed out, I will make note of the issues that relate to waste management. The class will then discuss some of the issues they think are causing some of these problems and the impacts they have on humans and wildlife. After this discussion, I will show them a **waste photo slideshow** on a variety of waste issues that graphically display major problems on Earth, which will then end with some pictures of waste generated at the school. Students will then write in their journals their reaction to what they just saw.  Next I will introduce how waste is managed in our area. Students will be led through a discussion about where they think our waste goes. Details will be provided about what our state, county, and city does to manage waste. Students will journal and discuss how they think we can eliminate the amount of trash going into landfills. Next, to introduce compost, I will hold up a jar of compost to show everyone. I will ask students to tell me what they think it is. Most will say “dirt” and I will ask them what makes up dirt. I will ask the question, *“How will this jar of dirt can make for a sustainable future?”* After discussion the question, I will show them a short video on the mechanisms of organic composting. Students will then complete an online worksheet **Composting – Questions to Think About**.  Concepts and principles of ecology will be taught while students begin to work on their Compost 101 presentation. Students will be given the **presentation assignment checklist** as a guide to prepare a Google Presentation or PowerPoint. The student sample of compost 101 will be shared with them as a suggestion to what is expected of them. The **5-point scoring rubric** will be made reference to for assessment purposes. The **Intro to Ecology** lecture and presentation will be given to students as they work on each slide of their Compost 101 presentation. Students will spend the next 2-3 periods completing their Compost 101 presentation and I will select 1-2 of the highest quality presentations to be shared with the class.  **Challenge Activities** – Weeks 2-12 (1-3 periods per week)  Students should now have a solid understand of composting and the ecology behind it. The focus will shift to having them identify some key waste issues of the school and community and then to propose some solutions addressing those issues. The **Compost Project Menu** will be handed out to students to show them the rest of the unit requirements. Students will focus on the question *How can composting today benefit the future?*  The four remaining projects, which the students will complete over the next 10 weeks will help them answer that question. Guest speakers are encouraged to be invited in to share their expertise and verify student research and project.  Project 2 Compost Survey result will be used as a discussion for the rationale of having a composting program in the school or community. Students will work in teams and generate 10 questions to ask people in the community. The goal is to get 50 surveys completed. The **Student Project Rubric** will provide students with the expectations for the survey.  Projects 3A and 3B will assigned as homework activities for students to remain connected to the project for the next couple of weeks. Both are video or photo projects that require the production of a documentary of a waste facility or tracking path of trash through the community. Students teams of 2-3 will use the **Video Project Organizer** to guide them through the storytelling process. The videos will be shown in class and to other classes upon completion.  Project 4: The Compost Challenge will be the next in-class phase of the unit. Specific details are outlined in the **Compost Project Menu**. Part 1 of the challenge groups students in teams of 2-3 to develop a presentation proposal for a compost system for the school. The challenge requires them to examine the wastes generated in the school more closely and apply the research on best practices to create an efficient composting system. The class will vote on the system design they think is the best and will then take the next steps to build and begin the composting system for the school. Part 2 of Project 4 is the data collection for the project. The class will regularly participate in the data collection process of the project by measuring the amount of waste collected and transferred into the compost as well as the moisture, temperature, pH, and nitrates. This data will be maintained in a log over the course of the term and most likely the rest of the school year. Each student will be required to collect data as part of their participation grade.  Once the composting gets underway, students will conduct the final project of the unit. The research project 5 is designed to give individual students or student teams of 2-3 an opportunity to research in much greater depth a topic relating to compost. The **Student Project Rubric** provides the criteria for this project and the **Compost Project Menu** contains the specific details and requirements. Students will be given considerable latitude as they decide what outcome they want to do in order to meet the requirements of the research project. Students will need to properly cite their sources and include a biobliography. Regular monitoring and feedback will be given to the students as well as conferences as a way to give them constructive input and check for progress. Use **Final Presentation Student Example** to provide insite on what the final project might look like.  *Optional: Students may be directed to use Diigo (*[*http://www.diigo.com*](http://www.diigo.com)*) to create a helpful bookmarking and source citing tool for their projects. Students will need to log onto Diigo and create an account or accounts can be made for them.*  **Synthesis Activity** – Weeks 11-12 (1-2 periods)  A Master Gardener will be invited in from the local office to evaluate our progress. Students will be assigned to present the various projects and their research with the guest to get feedback and input from a professional.  In addition, students will complete the **Peer Assessment Scoring Guide** during the research project presentations. Students will have an opportunity to discuss the scoring guide before the use of it to gain a better understanding of how it is used and to ask any questions. | | | | | |
| **Accommodations for Differentiated Instruction** | | | | | |
|  | **Special Needs Students** | | Students will be given extra time for study, adjusted learning outcomes, modified assignment and outcomes, adaptive and assisted technologies, support from specialists and organizational support material. In addition, after-school tutorial time will be available. | | |
|  | **Nonnative Speakers** | | Use of ELL instructional support materials for science, after-school tutorial time available, use of graphic organizers, dual-language dictionaries and translation tools. Regular use of audio-visual-kinethetic activities, left-brain/right-brain activities, and activities that address multiple intelligences will also be implemented. Students will have some flexibility to do oral outcomes instead of written ones. | | |
|  | **Gifted/Talented Students** | | Authentic outcomes (research project, documentary, compost challenge) will allow for greater flexibility for these students. Additional technological tools (wikis, web site development, video, other online tools) will be available for further exploration and differentiated outcomes. After school time will be made available for additional support for in-depth exploration and activities. | | |
| **Materials and Resources Required For Unit** | | | | | |
| **Technology – Hardware** (Click boxes of all equipment needed) | | | | | |

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| Camera  Computer(s)  Digital Camera  DVD Player  Internet Connection | Laser Disk  Printer  Projection System  Scanner  Television | VCR  Video Camera  Video Conferencing Equip.  Other Vernier Probes (various) |
| **Technology – Software** (Click boxes of all software needed.) | | |
| Database/Spreadsheet  Desktop Publishing  E-mail Software  Encyclopedia on CD-ROM | Image Processing  Internet Web Browser  Multimedia | Web Page Development  Word Processing  Other Various Web 2.0 Applications |

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| **Printed Materials** | Vernier Environmental Science Lab Book, Composting Guides, Biology Textbook |
| **Supplies** | Journals, composting kits, shovels, rubber gloves, containers of various sizes, Vernier Probes (pH, Soil Moisture, Temperature, Nitrogen), CBL2 and TI-83 Plus graphic calculator or Data Logger PC interface with Data Logger |
| **Internet Resources** | <http://compost.css.cornell.edu/science.html>  <http://www.co.marion.or.us/PW/ES/wastereduction/>  <http://www.wm.com/>  <http://www.attra.org/soils.html>  <http://whatcom.wsu.edu/ag/compost/fundamentals/>  <http://4hgarden.msu.edu/kidstour/zoo/zdcmain.html>  <http://www.howtocompost.org/cat_generalinfo.asp> |
| **Other Resources** | Guest speakers or Site Visits: County Public Works, Waste Management Industries, Garten Industries, Master Gardeners. |

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